

Type in the Field Mus. Nat. Hist. no. 642,439, collected at the headwaters of Río Tutunendo, east of Quibdó, Intendencia del Chocó, May, 1931, *W. A. Archer* 2204. Represented also by *Archer* 1951, from La Concepción, 15 km. east of Quibdó.

"Flowers 4-5 parted, green below, waxy white above, opening one by one in each head." Among the South American species of *Schradera* this is easy to recognize because the nerves are united to form a nearly regular collective nerve remote from the margin. The leaves are larger than in most species of the genus.

ZOOLOGY.—*Notes on fossil and recent Bryozoa.*<sup>1</sup> R. S. BASSLER,  
U. S. National Museum.

In his presidential address<sup>2</sup> delivered at the anniversary meeting of the Linnaean Society of London, May 28, 1931, Sir Sydney S. Harmer discussed rather severely the taxonomic studies on fossil and recent Bryozoa by Mr. F. Canu and myself.<sup>3</sup> His criticism is meant kindly and is well founded in some cases so that a reply would not be necessary if our volumes were consulted only by the bryozoan specialist. As we have compiled our works for the beginner in the science and general student, who are not so conversant with the subject, Mr. Canu and I felt that an answer, or at least an explanation of the circumstances concerning their preparation, should be forthcoming. Mr. Canu wished me to write a reply and expected to furnish me with notes, but his lamented death in February of 1932 prevented this.

At this point I should state for the benefit of the non-specialist that the fossil and recent Bryozoa have suffered from nomenclatorial troubles perhaps more than any other group of animals or plants, and as a result generic synonyms abound. The criteria for classification have changed from time to time and new genera have accordingly been proposed by one generation only to be discarded by the next. One celebrated case is that of D'Orbigny, the French naturalist of the nineteenth century, who based many bryozoan genera upon method of growth, a unilamellar form being distinct from a multilamellar one and both of these again different from the bifoliate zoarium, even though experience shows that all three styles of growth forms can exist in the same genus and even in the same species. The subject is further complicated by the failure of many of the earlier authors to cite a genotype.

Comparatively little work had been done upon the Post-Paleozoic

<sup>1</sup> Published by permission of the Secretary of the Smithsonian Institution. Received May 1, 1934.

<sup>2</sup> Proc. Linnaean Soc. London Sess. 143, 1930-31, pt. 8, pp. 113-168.

<sup>3</sup> *North American Early Tertiary Bryozoa.* Bull. 106, U.S. National Museum. 1920.

Bryozoa of North America up to the time Mr. Canu and I took up their study at the request of the U. S. Geological Survey and the Smithsonian Institution, particularly to secure the stratigraphic data that it was believed these organisms would furnish. The opportunity to publish several works upon the subject was seized by us as a means not only of making the faunal and stratigraphic information known, but also of revising as many genera as possible and presenting the essential features of each as worked out by previous authors and ourselves. At this point it should be stated that Mr. Canu's knowledge of English was rather slight and mine of French even less. Much of our manuscript was written in French, and in our earlier works there was always a danger that the exact meaning was not properly translated into English. Practically all of our work also was done with us separated by the Atlantic, so that again errors could creep in. Differences of opinion between us, particularly as to the recognition of genera and the application of the rules of nomenclature, for the same reason could not be thrashed out thoroughly and our results sometimes had to be a matter of compromise. For example, the type species of a genus in which the nature of the ovicell is the most essential generic character may not have shown an ovicell. In such cases Mr. Canu preferred to use such a generic name for the reception of species of that particular group which could not be more closely classified. In case the ovicells were later discovered, the question arose whether the genus should become valid dating from its original author or from the time its real definition was published.

Previous to Dr. Harmer's review, a vigorous statement against our methods of classification of the Cyclostomata was presented by Dr. Folke Borge in his academical dissertation of 1926, where after quoting us to the effect that "a natural classification can be built up by a study of the physiologic functions of the organs," he states that following such a principle the fishes and whales would belong to the same group. Dr. Harmer also writes at length concerning this, but a little tolerance on the part of both would certainly have led them to add the understood words "in the same group of organisms." Mr. Canu and I have probably not used the word physiology as carefully as we should, but in our minds physiology deals with the organic functions or vital phenomena of the living being and has an effect upon the anatomy or structure of the organism which in turn gives rise to its form or morphology. The physiological processes are certainly reflected in the anatomy and morphology. For example, in the Bryozoa, calcification of the walls producing the variously marked

cell surfaces upon which species and genera were founded in former times, is surely the result of a deposit of the organism itself, in other words, a physiological effect. Likewise, the form of the aperture, a purely morphological structure, is determined by the operation of the hydrostatic system and extrusion of the polypide, both certainly physiological in nature. I think, therefore, this criticism is far fetched and beside the point.

Again, we were not distressed when Dr. Harmer observed that "the physiology of Canu and Bassler is not that of observation and experiment, but that it is a physiology of inference." It is true that we were unable to review and digest every published observation, but we thought it our duty as paleontologists to try to resurrect the fossils by inferring the meaning of their characters from a study of recent forms. Without such inferences it is impossible ever to hope to build up a natural classification of fossil forms. Here again I should state that in some instances in stating our deductions or so-called inferences we have failed to add the words "in our opinion," but that surely should be evident to the tolerant reader. I am sorry that we laid stress upon the larval characters for the establishment of families, for as Dr. Harmer says, "that was singularly unfortunate." As a matter of fact, our family classification is based upon more information than the larvae and we only hoped that in time the larval characters would give the final distinguishing feature. I also regret that the two new suborders Hexapogona and Pentapogona were proposed; the latter at the last moment in the course of our 1927 work. The Mamilloporidae and five related families classified in the latter suborder certainly form a division distinct from the other two suborders, the Anasca and Ascophora of the Cheilostomata, but I would not wish to retain Pentapogona as a term for the last two.

Our critics have stated that often we did not follow the rules of nomenclature in our treatment of old, poorly defined, or otherwise unrecognizable genera. Dr. A. M. Waters, the most eminent of all bryozoologists, has repeatedly shown how impracticable it is to revert to old genera based on characters now known to be valueless. Dr. Harmer too has occasionally dropped generic names which, quite correctly in my estimation, he thought would be disadvantageous to the science to retain. Following such authorities, Mr. Canu and I tried to use common sense in nomenclatorial matters, but now after reviewing the entire field and completing the bryozoan chapter for the Fossilium Catalogus, I have to admit that if stability is to be maintained the rules must be followed no matter how illogical they

seem or how silly or unjust the effect. Many genera which by common consent have been dropped must now be recognized and redefined with no basis other than that of some obscure name selected as the genotype or occurring in the original list of species. I have followed this course in the Fossilium Catalogus and I trust that the foregoing remarks will explain our nomenclatorial heresies of the past. The changes made by this procedure will sadden the hearts of the older students, but the bryozoologists of the future can readily adapt themselves to the new arrangements. For example, the oft quoted Paleozoic genera *Fenestella* and *Monticulipora* must now go by the board for good reasons and many little known names now become valid. Some of these generic and other changes and new names for some preoccupied species are indicated in the following notes.

#### NEW GENERIC AND SPECIFIC NAMES

**Chiastosella** (Canu and Bassler) new genus (Cheilostomata, family Schizoporellidae). The ovicell is hyperstomial, not closed by the operculum; its external portion is surrounded by a punctate ectooecium more or less developed, and by an endooecium adorned with small pores arranged radially. The aperture bears on its proximal border a narrow rectangular sinus; the peristome bears distal spines. The frontal is a pleurocyst bordered by a double row at least of areolar pores. It bears two long, thin zooecial avicularia transversely oriented exteriorly.

*Genotype*.—*Schizoporella daedala* MacGillivray, 1882, in McCoy, Prod. Zool. Victoria, dec. 14: 146, pl. 138, fig. 4. Recent of Australia.

**Codonellina** new name (Cheilostomata, family Smitinidae). Proposed to replace *Codonella* Canu and Bassler, 1927, preoccupied by Haeckel, 1873.

**Fistuliphragma** new genus (Cyclostomata, family Fistuliporidae). This new genus, based upon a common, ramose Devonian species, differs from typical *Fistulipora* in that hemiphragms or semidiaphragms are developed in the zooecial tubes.

*Genotype*.—*Fistulipora spinulifera* Rominger, 1866, Proc. Acad. Nat. Sci. Philadelphia, p. 121. Devonian (Traverse group) of Michigan.

**Hippomonavella** (Canu and Bassler) new genus (Cheilostomata, family Schizoporellidae). The ovicell is hyperstomial. The frontal is a pleurocyst surrounded by a row of areolar pores. The aperture bears two cardelles more or less median. In front of the aperture there is an oral avicularium placed on the median axis of the zooecium.

*Genotype*.—*Lepralia praeclara* MacGillivray, 1895, Trans. Roy. Soc. Victoria 4: 73. Tertiary of Australia. *Lepralia radiata* Maplestone, 1901 and *Lepralia elongata* MacGillivray, 1895, also belong to this new genus.

**HIPPOPORELLA** Canu, 1917 (Cheilostomata, family Schizoporellidae). As pointed out by Miss Hasting in 1930, this genus created by Mr. Canu in 1917 with *Lepralia hippopus* as the genotype, has suffered some vicissitudes. Forgetting the original note in which it first appeared, we introduced the same name as a new genus in 1920 with a fossil species *H. perforata* as the genotype and further complicated the matter by naming *Hippoconella* new genus with *L. hippopus* as its genotype. Our only excuse is that at that time we were involved in the great mass of our 1920 work and mistakes would

creep in. Suffice it to say that *Hippoponella* becomes a synonym of *Hippoporella* Canu, 1917, and *Hippoporella* Canu and Bassler, 1920, must be dropped as a homonym.

**Monticuliporella** new name (Order Trepotomata). Proposed for *Monticulipora* D'Orbigny, 1850 and subsequent authors (not D'Orbigny, 1849).

*Genotype*.—*Monticulipora mammulata* D'Orbigny, 1850 (not *Monticulipora* D'Orbigny, 1849, Rev. Mag. Zool., ser. 2, vol. 1: 503). In founding *Monticulipora* in 1849, D'Orbigny clearly states the genotype as *Ceripora pustulosa* Michelin, 1846, a synonym of the genotype of *Ceriocava* of the family Ceriocavidae (Cyclostomata). *Ceriocava* thus becomes a synonym of *Monticulipora* and Ceriocavidae of the Monticuliporidae. For the reception of *Monticuliporella* and allied genera of the Trepotomata, the family Prasporidae proposed by Simpson in 1897 is available.

**Pachythecella** new name (Cheilostomata, family Porinidae). Proposed for *Pachytheca* Canu, 1913, preoccupied by Schlüter, 1885.

**Semicytella** new genus (Cyclostomata, family Cytisidae). Proposed for *Semicytis* Canu and Bassler, 1922, Proc. U.S. Nat. Mus. 61: 74.

*Genotype*.—*Semicytis disparilis* D'Orbigny, 1850 (not *Semicytis* D'Orbigny, 1854, Bry. Cret., p. 1048. Genotype (selected by Gregory, 1909) *Osculipora rugosa* D'Orbigny, 1850, a synonym of *Desmepora* Lonsdale, 1850.)

**Smittinella** (Canu and Bassler) new genus (Cheilostomata, family Smitinidae). The ovicell is hyperstomial, not closed by the operculum; it opens into a peristomie. The aperture bears a lyrule and two cardelles. The peristome is indented by a sinus or bears a spiramen when it is complete. The frontal is a tremocyst in which the number of pores depends on the zoecial width. A large zoarial avicularium can be found occasionally on the longitudinal axis of the zoecium.

*Genotype*.—*Eschara tatei* Tenison-Woods, 1876, Proc. Roy. Soc. New South Wales 10: 149, fig. 3. Tertiary. of Australia. This genus differs from *Smittina* in that the proximal sinus of the peristomie is completely covered by the peristome which is then pierced by a spiramen.

**Tubitrabecularia** (Canu and Bassler) new genus (Cheilostomata, family Tubucellariidae). Tubucellariidae in which the zoecial frontal is an olocyst. The peristomie is strengthened by a trabecular net-work supporting a more or less thickened epicalcification. The ovicell is peristomial. Exterior aspect of the zoecia irregular and quite different from the true zoecial form observed in the interior. Ascopore visible with difficulty at the exterior but clearly seen in the interior.

*Genotype*.—*Tubitrabecularia (Eschara) elevata* Tenison-Woods, 1876, Trans. Roy. Soc. New South Wales 10: 2, fig. 10. Tertiary of Australia.

**Centronea americana** new name. Proposed for *Centronea micropora* Canu and Bassler, 1920 (not Reuss) of the Eocene of North Carolina. The American species is more robust and has larger micrometric dimensions.

**Lagenipora lacunosa** new name. Proposed for *Lagenipora verrucosa* Canu and Bassler, 1930, Proc. U.S. Nat. Mus. 76: 35, pl. 6, fig. 1 (Galapagos Islands), not *Lagenipora verrucosa* Canu and Bassler, 1928, Proc. U.S. Nat. Mus. 72: 137, pl. 21, figs. 5-8 (Gulf of Mexico).